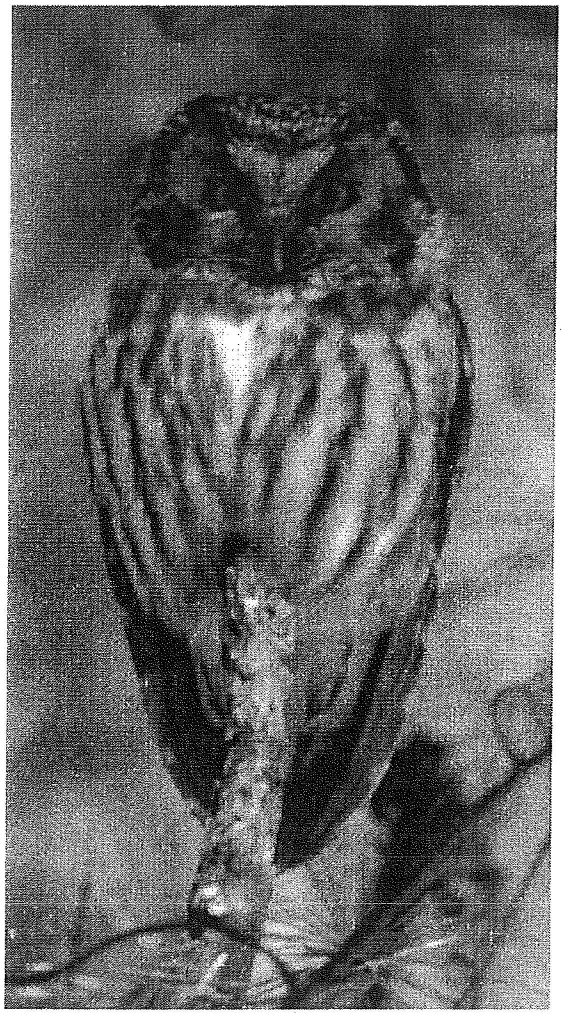
Owl and Wintering Bird Surveys, Yukon-Charley Rivers National Preserve

1999 Progress Report



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EXECUTIVE SUMMARY

Owls.--We conducted owl surveys in remote areas of Yukon-Charley Rivers National Preserve in March/April 1999. Owl presence, location, call activity, and environmental data were recorded during silent 8-minute count periods at stops 0.8 km apart along snowmobile transects. Transect lengths varied from 18.4 km (24 stops) to 12 km (16 stops). Surveys began at sunset and were completed within 4-5 hours. Distance estimates and direction were recorded for all owls detected in order to assign each bird to an ecological unit and to keep track of the distance over which individuals were heard.

We recorded 55 unique detections for boreal owls and 8 for great-horned owls over 180 stops. Detection rates for both species were high 1-4 hours after sunset, with boreal owl calls peaking 1-2 hours after sunset.

71% of 55 boreal owl detections and 63% of 8 great-horned owl detections occurred when the moon was visible to the observer; the moon was visible at 39% of 180 stops. However, neither boreal owl nor great-horned owl call rates (number of calls per 8-minute period) appeared to vary with moon visibility.

Count period data showed that 31% of all boreal owls and 38% of all great-horned owls were heard only in the last 3 minutes of the 8-minute count period. If we had stopped the count at 5 minutes, we would have missed nearly 1/3 of all detections.

Methods are being refined and a second field season is planned for March 2000.

Wintering Birds.--Concurrent with the owl surveys, we conducted diurnal point count surveys for wintering birds. All birds heard and seen during a 5-minute period were recorded along with a distance estimate from the observer to the bird. Point counts were conducted every 200 m in treed habitats and 300 m in open habitats along the transect; a transect consisted of 10-12 points. Earth cover classes were used to classify habitat within 50 m of the observer.

Fourteen species were detected during count periods on these surveys; two additional species were detected while traveling between points on the transects. American dippers were found in open water leads on the Charley and Nation Rivers while traveling by snowmobile between study areas, and snow buntings were identified on the Yukon River on March 25. Most commonly detected species included common redpolls, gray jays, white-winged crossbills, and boreal chickadees. Peak bird detection was between 2 and 4 hours after sunrise.

Seventy percent of the birds detected were within 60 m of the observer. Birds commonly heard at distances >70 m included common ravens and northern three-toed woodpeckers. The single northern goshawk and 1of the 2 hairy woodpeckers detected were also >70 m from the observer.

Species richness was highest in the Yukon River Valley—Nation/Kandik/Bonanza Tributary Valleys ecounit (YV6). Bird abundance and species richness were low in the shrub categories and high in both the open needleleaf and open mixed needleleaf/deciduous land cover types.

A second field season is being planned for March 2000.

INTRODUCTION

Yukon-Charley Rivers National Preserve was established in 1980 by the Alaska National Interest Lands Conservation Act [Title II, Sec. (10)] to maintain the environmental integrity of the Charley River watershed and the populations of fish and wildlife within its borders. The complex geology, climatic conditions, natural fire regime and discontinuous permafrost soils have produced a diverse mosaic of taiga and tundra habitat types. The sedimentary rock record in the preserve is nearly complete, with layers dating from the Precambrian to the present. North of the Yukon River lies the oldest terrain in Alaska, which is likely part of the original continental margin (G. Mull, Alaska State Division of Geological and Geophysical Surveys, personal communication).

The diverse landscape within the preserve provides habitat for a vast array of bird species. The presence of 163 species (many of them Neotropical migrants) have been documented in the preserve (National Park Service NPSpecies database 1999). Aberrant species from more southern and eastern temperate regions are often found in the preserve because of its geographic location. The preserve is part of the Yukon River flyway, one of the natural corridors funneling migrating birds to and from Alaska during spring and fall (Skip Ambrose, U.S. Fish and Wildlife Service, personal communication).

Despite the apparent importance of the preserve to birds, information on species distribution and abundance is almost non-existent for most geographic areas and seasons. The most complete information exists for peregrine falcons (*Falco peregrinus*), whose nesting success and productivity have been studied along the Yukon and Charley Rivers since the early 1970's (Ambrose 1997). Yukon-Charley Rivers National Preserve supports the highest known density of the recently delisted American peregrine falcon (*F. p. anatum*) in North America.

For other species, information is limited to inventory lists compiled opportunistically by NPS since 1980 in a few areas of the preserve. In the mid-1980s, six line transects were established along the Yukon River to assess summer passerine abundance in riparian areas surrounding peregrine aeries (Hunter et al.1988). Information on summer abundance was also obtained from two MAPS (Monitoring Avian Productivity and Survival) mistnetting stations at Coal Creek Camp in 1994 (Fox and App 1994). Finally, two off-road point count transects were established in 1997 as part of a long-term monitoring effort initiated by Boreal Partners in Flight (McKee 1999). These efforts are minuscule in comparison to the vast amount of land in the preserve.

In 1998, Yukon-Charley Rivers National Preserve was selected to receive funding from the National Park Service (NPS) Servicewide Inventory and Monitoring Program to conduct inventory work on birds. A study plan was submitted and approved in May 1998 (National Park Service 1998). The goals for the inventory project were to: 1) design and implement an avian inventory plan in Yukon-Charley Rivers National Preserve with methodology suitable for large parks and preserves that have minimal access and 2) develop a long-term monitoring protocol for birds in the preserve. To achieve these goals, the following objectives are being pursued:

1. Collect and summarize all existing information on the distribution and abundance of birds in Yukon-Charley Rivers National Preserve;

2. Obtain geographic data layers needed to characterize habitat (vegetation, hydrology, fire history, and ecological subsections);
3. Determine associations between bird abundance by species and habitat characteristics for at least 90% of the bird species estimated to exist in the preserve during the breeding season; extrapolate this information to obtain parkwide abundance and distribution estimates;
4. Examine distribution and relative abundance for wintering birds;
5. Document owl species presence/absence by ecological subsection; and
6. Design a bird monitoring program for the preserve.

This report presents preliminary data from owl and wintering bird surveys conducted in March/April 1999; these surveys were implemented to address objectives 4 and 5 above. A second field season is scheduled for March/April 2000.

John Burch, Chris McKee, and Steve Ulvi provided camaraderie and amusement (plus some useful field assistance). The authors are still trying to determine if they appreciated their contributions to the project.

STUDY AREA

Yukon-Charley Rivers National Preserve is a 2.5 million acre NPS unit located in eastern interior Alaska, just south of the Arctic Circle, and bordering Yukon Territory, Canada (Fig. 1). Elevation in the preserve rises from 220 m at the Yukon River to 2000 m in the mountains to the south. The semi-arid continental climate in the preserve area results in annual precipitation means of 30.2 cm in the eastern portion of the preserve and 20.9 cm in the western portion of the preserve [National Weather Service data for Circle, AK (1957-1997) and Eagle, AK, (1949-1997)]. Mean daily temperatures range between 15.6°C in July and -25°C in January.

The preserve is within the subarctic boreal forest zone and major tree species include: black spruce (*Picea mariana),* white spruce (*P. glauca*), aspen (*Populus tremuloides*), and balsam poplar (*Populus basamifera*). Willow (*Salix* spp.) and alder (*Alnus* spp.) are the most common shrub species. Major forest communities found in the preserve are spruce forest, mixed spruce-broadleaf forest, and broadleaf deciduous forest. Black spruce woodland, mixed spruce-broadleaf woodland, and broadleaf woodland are the major woodland communities. Wetland (bogs, marshes, and lake/open water areas) and alpine tundra communities are prominent in the preserve.

Surveys were conducted in 2 primary areas of Yukon-Charley Rivers National Preserve: Coal Creek/Charley River vicinity (March 14-20) and the Nation River/Yukon River area (March 21-25; Figs. 2 and 3). These areas were selected based on geographic location and ease of access. Ecological subsection units surveyed in the Coal Creek area were Biederman Hills, Thanksgiving Loess, Tintina Hills, Charley Foothills, Yukon River Valley units YV1, YV2, YV3, and YV5, and the Upper Charley Mountain Tundra units MT2 and MT3. Ecological subsection units surveyed in the Nation River area included the Hard Luck Lowland, Ogilvie Foothills, Tintina Hills, and Yukon River Valley Units (YV1, YV3, and YV5). Ecological subsection units used in this study are described in D. Swanson (1999).

METHODS

Owl Surveys

All owls detected and the number of calls they made during a silent (not using broadcast calls) 8-minute count period were recorded at stops 800 m (0.5 miles, straight-line distance) apart along snowmobile transects. Initial transect lengths were 18.4 km (12 miles; 24 stops) but they were shortened to 12 km (8 miles; 16 stops) due to time constraints and observer fatigue. The 8-minute count periods were broken into 0-3 minute, 3-5 minute, and 5-8 minute intervals to evaluate additional information gains as the survey period increased. The number of calls heard per individual bird was recorded for each interval.

Distances from observers to calling owls were estimated and compass bearings on call directions were recorded to examine species detection distances, to identify which ecological unit owls were calling from, and to minimize double counting of individual birds. The estimated distance to the owl, the compass direction of the call from the observer, and the observer's geographical location were plotted in ARCVIEW to determine owl locations. Moon visibility, wind speed, cloud cover, and precipitation conditions were recorded at each survey point as well as Global Positioning System (GPS) locations and the ecological unit at each point. Transects often passed through more than 1 ecounit. Owl surveys started at sunset and were completed within 4-5 hours. Sunset/sunrise times for the preserve were determined from military astrological charts generated for Eagle, AK and Circle, AK from website http:/tycho.usno.navy.mil/srss.html.

To collect information on seasonal shifts in owl species and/or individuals calling, a second survey effort took place April 5-9, 1999. The three owl survey transects based out of Coal Creek Camp were repeated using the same stops and survey methods.

Tape playbacks were not used to elicit owl calls in this survey to avoid drawing owls into areas or habitats that may not have been part of their normal territory. Though taped playbacks are effective for determining owl species presence/absence data (Lundberg 1978), there are increased risks of predation on smaller owls by larger owls, disruption of foraging and courtship activities, and possible luring of the female from the nest (Smith 1987, Takats 1999).

Scientific names for owl species are given when first discussed in the text.

Wintering Bird Surveys

Wintering passerine birds, raptors, and diurnal owls were surveyed during daylight hours using off-road point count techniques. Snowshoes were used to travel along a transect running up or down elevation gradients or perpendicular to the river on flood plains. Point counts were conducted every 200 m in treed habitats and a minimum of 300 m in open habitats along the transect. Transects consisted of 10-12 point count stops. At each stop, all birds detected during a 5-minute period were recorded along with the estimated distance interval between the bird and the observer. Distance estimation intervals used were: 0-10 m, 11-20 m, 21-30 m, 31-40 m, 41-50 m, 51-60 m, 61-70 m, and >70 m. A GPS location and ecological unit descriptor was recorded for each point count stop. Earth cover classes (Ducks Unlimited 1998) were used to classify vegetation at each point count stop. Bird species detected between stops that were not detected during a point count event were recorded. Surveys started within 1 hour after sunrise, which changed from 0641 h to 0611 h between March 16 and March 24.

In order to establish winter bird survey protocols, we ran surveys during both morning and afternoon periods. After completing a morning transect, we took a break and then ran the transect backwards in the afternoon, stopping at the same point count stations.

Scientific names for all bird species detected during point count periods on the winter bird surveys are listed in Table 3; scientific names for other species detected during the project or discussed in this report are given in the text when first discussed.

Statistics

Differences in mean calling rates for great-horned owls (*Bubo virginianus*) was tested using a one-tailed Student's t-test assuming equal variance.

RESULTS

Owl Surveys

Seven owl surveys were conducted in the preserve March 14-24, 1999 (Table 1; Figs. 2-3). Forty-nine boreal owls (*Aegolius funereus*) and 5 great-horned owls were detected during the March surveys for a detection rate of 1.9 boreal owls/survey hour (0.36 birds/point) and 0.16 great horned owls/survey hour (0.04 birds/point).

The 3 transects radiating from Coal Creek Camp were re-surveyed April 6-8, 1999 and produced 6 boreal owls and 3 great-horned owls (Table 1); 10 boreal owls and no great-horned owls had been recorded on these routes during the March surveys. April survey detection rates were 0.47 boreal owls/survey hour (0.12 birds/point) and 0.23 great-horned owls/survey hour (0.06 birds/point); comparatively, these same 3 routes produced 0.15 boreal owls/point and no great-horned owls in March.

Detectability.--Peak detection times during the sampling period (sunset to 5.5 hours after sunset) for both boreal and great-horned owls were 1-4.5 hours after sunset [Fig. 4(a)]; the corresponding number of point counts conducted by half-hour intervals is graphed in Fig. 4(b). Sunset times during the first field session changed from 1833 h on March 14 to 1856 h on March 20. The change to daylight-saving time occurred on April 4, so sunset times for the second field session increased from 2047 h on April 6 to 2057 h on April 8. Seventy-one percent of the boreal owl detections (n=55 detections) and 63% of the great-horned owl detections (n = 8 detections) occurred when the moon was visible to the observer; the moon was visible at 39% of the stops during the study (n = 217). Boreal owl call rates (number of calls per 8-minute period) did not appear to vary with moon visibility. The percentage of boreal owls producing >20 calls per 8-minute period was 25% when the moon was not visible (n=16 birds) and 23% when the moon was visible (n =39 birds). Great-horned owls produced a mean of 3 calls per 8-minute period when the moon was not visible (n = 3 birds) and 7 calls per 8-minute period when the moon was visible (n = 5 birds); these means are not significantly different (Student's T-Test; P = 0.105).

The number of boreal owls calling >20 times per 8-minute point count period increased from 20% for the March surveys (n = 49 birds) to 50% (n = 6 birds) for early April surveys. Great-horned owls decreased their call rates from 7 calls per 8-minute period in March (n = 5 birds) to 3 calls per 8-minute period in April (n = 3 birds); the moon was not visible when great-horned owls were detected during the April surveys.

The combined data from both survey periods showed that 17 boreal owls (31% of all boreal owls detected) and 3 great-horned owls (38% of all great-horned owls detected) were heard only during the last 3 minutes of the 8-minute count period. Had the survey count period stopped at 5 minutes, we would have missed nearly one third of the owls detected on the surveys.

Distance estimations.--Distance estimations for boreal owls ranged from 70 m to 1500 m, with 27% of the birds being >800 m from the observer. Great-horned owl distance estimates ranged from 30 m to 2500 m, with 56% of those detections being >800 m. Based on examination of owl locations when plotted in GIS, distances were greatly underestimated. In several instances, observers felt that owls were calling from cliffs or steep slopes on the river valley and distance estimates/azimuths gave locations in the river bottom.

Since the accuracy of the distance estimations prohibited placing the bird in a ecounit with any degree of confidence, habitat associations could not be examined. Revising our method of owl location determination should allow us to look at owl/ecounit associations from surveys run in 2000.

Wintering Bird Surveys

Species diversity.--Six off-road point count transects for wintering birds were run between March 16 and March 24, 1999 (Figs. 2 and 3; Table 2). Transects contained between 10 and 12 points each for a total of 68 sample points (Table 2). Species diversity was highest on the Nation River North route and lowest on the Nation River South route (Table 2). Fourteen species were detected during these surveys (Table 3). In addition to these 14 species, a downy woodpecker (*Picoides pubescens*) and a great-horned owl were identified while traveling between points on the transects and American dippers (*Cinclus mexicanus*) were found in open water leads on the Charley and Nation Rivers. Snow buntings (*Plectrophenax nivalis*) were observed on March 25 while traveling along the Yukon River. The most commonly detected species during the point count periods were common redpolls (frequently in flocks), gray jays, white-winged crossbills (usually in flocks), and boreal chickadees (Table 3).

Detectability.--The peak bird detection period was between 2 and 4 hours after sunrise [approximately 0800-1100 h; Fig. 5(a) and 5(b)]. Fifty-seven percent of the birds identified on the surveys were detected during this time period (n = 306 birds). The number of birds detected dropped rapidly after 1400 h.

Sixty-eight percent of the birds identified on the surveys were detected within the first 3 minutes of the five minute count period (n = 306 birds). Eleven species were detected during the 0-3 minute intervals of the point count periods; 3 additional species (boreal owl, northern hawk owl, and sharp-tailed grouse) were detected only during the 3-5 minute intervals. If the point counts had been limited to 3-minute intervals, we would have missed detecting 107 individuals and 3 species.

Distance Estimation.—Seventy-seven percent of the birds detected (both visually and by call) were estimated to be within 60 m of the observer (n = 306 birds; Fig. 6). Species usually estimated to be within 60 m included white-winged crossbills and boreal chickadees; 98% of the white-winged crossbills and 93% of the boreal chickadees detected were estimated to be within 60 m of the observer (n = 40 and n = 28, respectively). Twenty-one percent of all birds were >70 m from the observer. Species commonly heard >70 m included common ravens (81% of raven detections, n = 16) and northern three-toed woodpeckers (70% of detections, n = 10); the single northern goshawk and 1 of the 2 hairy woodpeckers detected were also >70 m from the observer. Common redpolls and gray jays were the only species detected in all distance bands. Though we used unlimited distance estimation techniques, we were unable to obtain large enough sample sizes (>60 detections per species; Buckland et al. 1993) to examine species density estimates.

Habitat.--Eight ecounits were sampled during these surveys (Table 2). Species richness was highest in the Yukon River Valley--Nation/Kandik/Bonanza Tributary Valleys unit (YV6); 8 bird species were detected in this unit. Seven species were identified in the Biederman Hills (BH1) and Yukon River Valley--Active Floodplain (YV1) units. Species richness was lowest in the Yukon River Valley--Wet Terraces with Few Ponds (YV3) unit, where only 3 species were identified.

Multiple earth cover classes were located within each ecounit (Table 4). Species richness was highest in open needleleaf vegetation, but bird abundance was highest in open mixed needleleaf/deciduous (Table 5). Open needleleaf vegetation occurred in all ecounits except YV3 and Yukon River Valley—High Terraces, Undulating (YV5; Table 4); the YV3 and YV5 ecounits had the lowest species richness of the ecounits sampled. Bird abundance and species richness was low in the shrub categories sampled (Table 5) and consisted mostly of gray jays, ravens and white-winged crossbills flying overhead, and redpolls eating birch seeds.

White-winged crossbills, common redpolls, boreal chickadees and gray jays were most abundant in open needleleaf vegetation (Table 5). Woodpeckers were found in open needleleaf and woodland needleleaf vegetation. Sharp-tailed grouse and northern hawk owls were detected only in woodland needleleaf. Pine grosbeaks were equally abundant in woodland needleleaf and closed mixed deciduous vegetation. Gray jays and common redpolls were found in the greatest variety of habitats (Table 5).

DISCUSSION

Owls

Six species of owl potentially breed in the preserve. Only 2 species (boreal and great-horned owls) were detected during the March/April nocturnal surveys. In addition to boreal and great-horned owls (which we did detect), we had anticipated detecting great gray owls (*Strix nebulosa*) and potentially northern saw-whet owls (*Aegolius acadicus*) on these surveys. Great gray owls have been observed and documented in the preserve and one of these owls (found dead in the preserve) was taken to the University of Alaska Museum for vouchering in 1999. Northern saw-whet owls have not yet been detected in the preserve, though they are relatively abundant in southern Alaska; northern saw-whet owl distribution in Alaska has not been well established. Northern hawk owls are diurnal and we did not expect to detect them during the nocturnal surveys. We did detect 3 northern hawk owls during the daylight wintering bird off-road point count transects in March. Snowy owls (*Nyctea scandiaca*) may exist in the preserve as occasional visitors during winter or spring but likely do not breed in the preserve. Short-eared owls (*Asio flammeus*) are migratory and were not expected to be present during the March survey time period, though they likely arrive in the preserve mid-late April.

Owl calling (and call detection) is affected by many variables including: weather (wind velocity, precipitation, temperature, cloud cover, lunar cycle, and barometric pressure); temporal factors (time of night, hours after sunset, hours before sunrise, and season); and behavioral/biological factors (sex, age, breeding status, breeding pairs in the area, prey availability, and other owl species present) [Fuller and Mosher 1981, Palmer 1987, Smith 1987, Clark and Anderson 1997]. Calling activity of boreal owls in Colorado was slightly influenced by wind, precipitation, and moon phase; cloud cover and temperature had no effect on calling activity (Palmer 1987). Clark and Anderson (1997) also found no correlation between cloud cover and boreal owl calling rate in Wyoming. We did not obtain sufficient data to examine correlations between owl calling and other weather variables, but wind and snow definitely inhibited our ability to hear owls at several points during the surveys.

Changing light intensity as a result of moonlight may affect owl calling (Palmer 1987, Clark and Anderson 1997). Boreal owls in Yellowstone National Park (Wyoming) are more vocal when moonlight is present so owl surveys are conducted on clear, moonlit nights (Katy Duffy, National Park Service, personal communication). However, boreal owls in Clark and Anderson's study (1997; also in Wyoming) did not appear to respond to lunar changes, though seasonal patterns showed biweekly peaks which coincided with a full moon phase. Palmer (1987) heard more boreal owls calling during a full moon than during any other moon phase. In our study, more boreal and great-horned owls appeared to be calling when the moon was visible, though there was a new moon during the March surveys; the moon was full during the 3 April surveys but few owls were heard on those routes. Call rate in this study did not appear to be influenced by moon visibility. During the March 2000 surveys the moon phase will range from full to last quarter, presenting an opportunity to further examine this question.

For the time period we surveyed (sunset to 5.5 hours after sunset), owl detectability stayed relatively high between 1 and 4.5 hours after sunset. Clark and Anderson (1997) found this same pattern for boreal owls in western Wyoming. Based on similar findings from the Canadian Provinces, the draft Owl Monitoring Protocol for Canada advocates owl surveys to be conducted from ½ hour after sunset until midnight (Takats et al. 1999).

The highest owl detection period in this study occurred between 1 and 2 hours after sunset. Boreal owls in Wyoming were more vocal in the first hour after sunset (Clark and Anderson 1997), but Musel and Stutz (1989) found the first 2-3 hours after dark to be the most vocal period for boreal owls in Idaho. Rohner and

Doyle (1992) reported that great-horned owls in southwest Yukon, Canada began hooting close to the nest 1 hour after sunset.

We will attempt to complete the 2000 owl surveys within 4 hours of sunset, though owls may be calling at other times of night as well. Bondrup-Nielsen (1978) found that boreal owls were sporadically active throughout the night with periods of activity lasting up to 4.5 hours; males may sing all night during the height of the breeding season. In northern Scandinavia, a bimodal pattern of activity was found with peak activity occurring just after sunset and just prior to sunrise (Korpimaki 1981). Boreal owl call rates in Alberta were found to be lowest between midnight and 0400 h (Takats 1998).

Optimal seasonal survey times for owl species in interior Alaska have not been determined. In one Alaskan study, boreal owl singing peaked between mid February and March (Meehan 1980). Boreal owls call most frequently before mating and based on a mean laying date of 13 April in Anchorage (Ted Swem, USFWS, unpublished data) this would occur between mid March and mid April. Boreal owls further north were expected to have later laying dates and consequently later peak detection periods (Ted Swem, USFWS, personal communication). Based on this and other boreal owl detection data from the Anchorage area (Brad Anderson, USFWS, personal communication), late March to mid- to late April was proposed as the peak detection time for boreal owls in interior Alaska (Colleen Handel, USGS-BRD, personal communication). Due to river and overflow conditions, we were advised that travel by snowmobile in the preserve should not occur beyond the second week of April, hence our study period was in mid-late March.

On the 3 routes that were rerun in April, slightly more owls were detected in March (0.15 birds/point) than in April (0.12 birds/point), suggesting that on a seasonal basis, peak calling/detection periods for boreal owls may occur in March in the preserve. These results are based on very small sample sizes (10 birds in March and 6 in April) and are also influenced by bad weather incurred during the Coal Creek Route in April; this route had 8 owl detections in March and only 1 in April. Snow during that survey likely negated owl detection during the first 5 points on that route. Conversely, owl detections on the Yukon River I-McGregor Bluff route increased from zero in March to 4 in April. Additional sampling is needed to accurately determine seasonal owl detection trends.

Though slightly more boreal owls were detected in March than in April, call rates were higher during the April surveys. We hypothesize that as owls obtained mates they were calling less, if at all (hence the fewer number of owls detected per point), but that call rates of unpaired owls increased as they attempted to obtain a mate late in the breeding season. Bondrup-Nielsen (1978) found that boreal owl calling intensity drops dramatically after a female is attracted and may cease altogether after a few days; calling intensity was found to intensify again just before unpaired males on territories stopped calling for good. Lundberg (1978) also proposed that the number of boreal owls singing was inversely related to breeding success. To maximize boreal owl detections (based on our current data), we should continue surveying prior to the first week in April, though prey abundance and varying environmental conditions likely will influence call rates on a year-to-year basis (Hayward 1994).

Wintering Bird Surveys

Beyond Audubon Christmas Bird Count information (which is not habitat linked), little information on wintering birds in interior Alaska is available. We hoped to obtain presence/absence and habitat use information for wintering birds through this portion of the inventory project. Though sample sizes for most species were small, we identified 18 of the 23 bird species we expected to find overwintering in the preserve. After examining the 1999 breeding bird data (Swanson and Nigro 1999) and the wintering bird data, we surmised that the March winter survey period may be an opportune time to survey for drumming woodpeckers (downy, hairy, northern three-toed, and black-backed woodpeckers occur in the preserve) and American dippers (feeding at open leads along major tributaries). Expected wintering bird species that we did not encounter may either occur in very low numbers in the preserve, be found at higher latitudes than inventoried, or occur in landcover units that we did not cover.

We were unsure about peak bird detection periods during winter daylight hours since little winter bird survey work has been completed in Alaska. Though midwinter daylight is limited to as little as 6 hours (including twilight hours) in Alaska, day length was up to 12 hours by the end of March. We hypothesized that birds might be active (primarily feeding) during most of the daylight hours and sampled birds from 0730 to 1800 h. Instead, bird detections declined markedly after 1300 h, indicating that birds apparently were able to satiate and become less active by early afternoon. Based on this premise, we will begin the 2000 wintering bird surveys shortly after sunrise and complete them by 1300 h.

With increased sample sizes from a second year of sampling, we hope to present a better picture of winter bird species distributions and habitat use. We intend to increase the count time interval to 8 minutes, which will also result in additional bird and/or species detections.

PROJECT RECOMMENDATIONS FOR 2000

Following are recommendations (based on 1999 data) for the winter portion of the Yukon-Charley Rivers National Preserve Bird Inventory Project. These recommendations will be used to improve data collection and minimize safety and health risks for field staff in 2000.

Owl Surveys

- Map owl locations on 1:63,500 scale topographic maps to facilitate distance estimations and obtain more accurate positions. Continue recording distance estimates and azimuths for each owl detected.
- Practice distance estimation and location mapping with field crews prior to surveys. Standardize estimations and techniques between crew members.
- Emphasize the need to give actual counts of calls in each time interval to more accurately examine calling rates by time of night and season; listing owls as "constantly calling" or "incessant" does not provide enough information for determining call rates.
- Record temperature, wind conditions, sky cover, and precipitation at each point. Start and finish weather data was insufficient to describe calling conditions along the routes.

- Shorten protocol to 8-mile transects of 16 points due to travel times of >15 minutes per point and the need to complete surveys within 4-5 hours of sunset.
- Use 800 m straight-line distances between points on the transects using a GPS unit. Recording distances using snowmobile odometers does not account for meandering or braided riverbeds and trails.
- Purchase Luxmeters (light meters) to measure light intensity at each survey point in addition to recording moon visibility. Though the moon may not be visible to the observer, it may be to the calling owl. Measuring light intensity may provide better correlation data with calling owls than whether or not the moon is visible to the observer.
- Attempt to survey at higher elevations. Continue maximizing ecounit coverage.
- Increase the field crew to 6 to allow 2 people to trail break/set trail during the day, 2 to conduct owl surveys at night, and 2 to conduct wintering bird transects during the day. This will reduce fatigue and increase survey safety and efficiency.
- Double survey some routes using staggered starting times on the same evening to look at temporal detection changes.
- If time permits, rerun several routes in April to again examine seasonal trends in species detection and call rates.
- Continue wearing ear protection while running snowmobiles. Allow ears to readjust to quiet after running snowmobiles between points.
- Continue with winter backcountry training for field staff prior to conducting surveys.
- Maintain regular communications via the park radio system.

Wintering Bird Surveys

- Complete surveys by 1300 h; very few birds detected after this time.
- Attempt to survey 10 points (>300 m apart) in open habitat areas and 12 points (>200 m) in treed habitat areas. Terrain and snow depths can greatly increase between point travel time.
- Begin conducting 8-minute point counts, maintaining 0-3, 3-5, and 5-8 minute recording intervals.
- Carry recording microphones for documenting and/or verifying unidentified or unusual calls.

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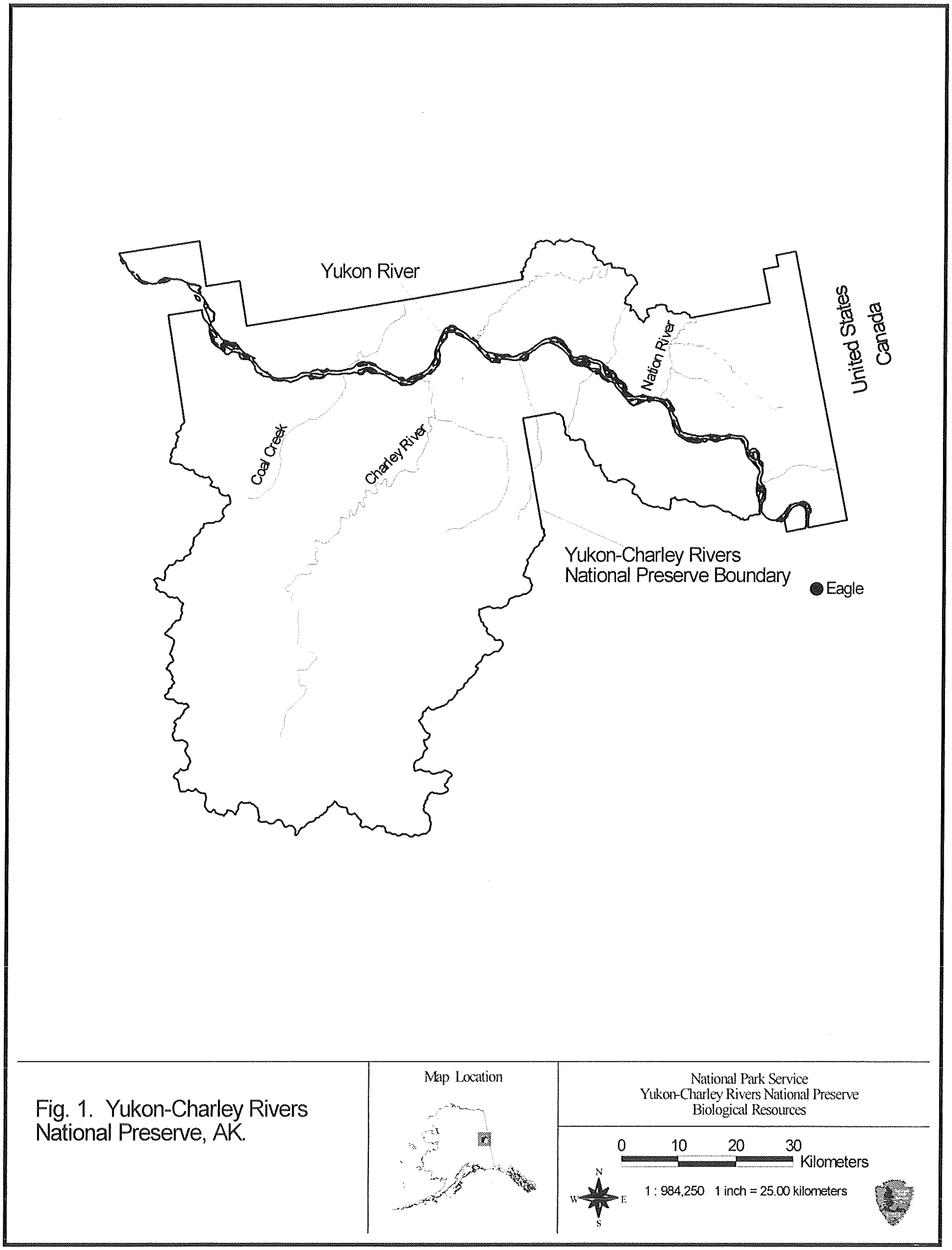

Fig. 1. Yukon-Charley Rivers National Preserve, AK.

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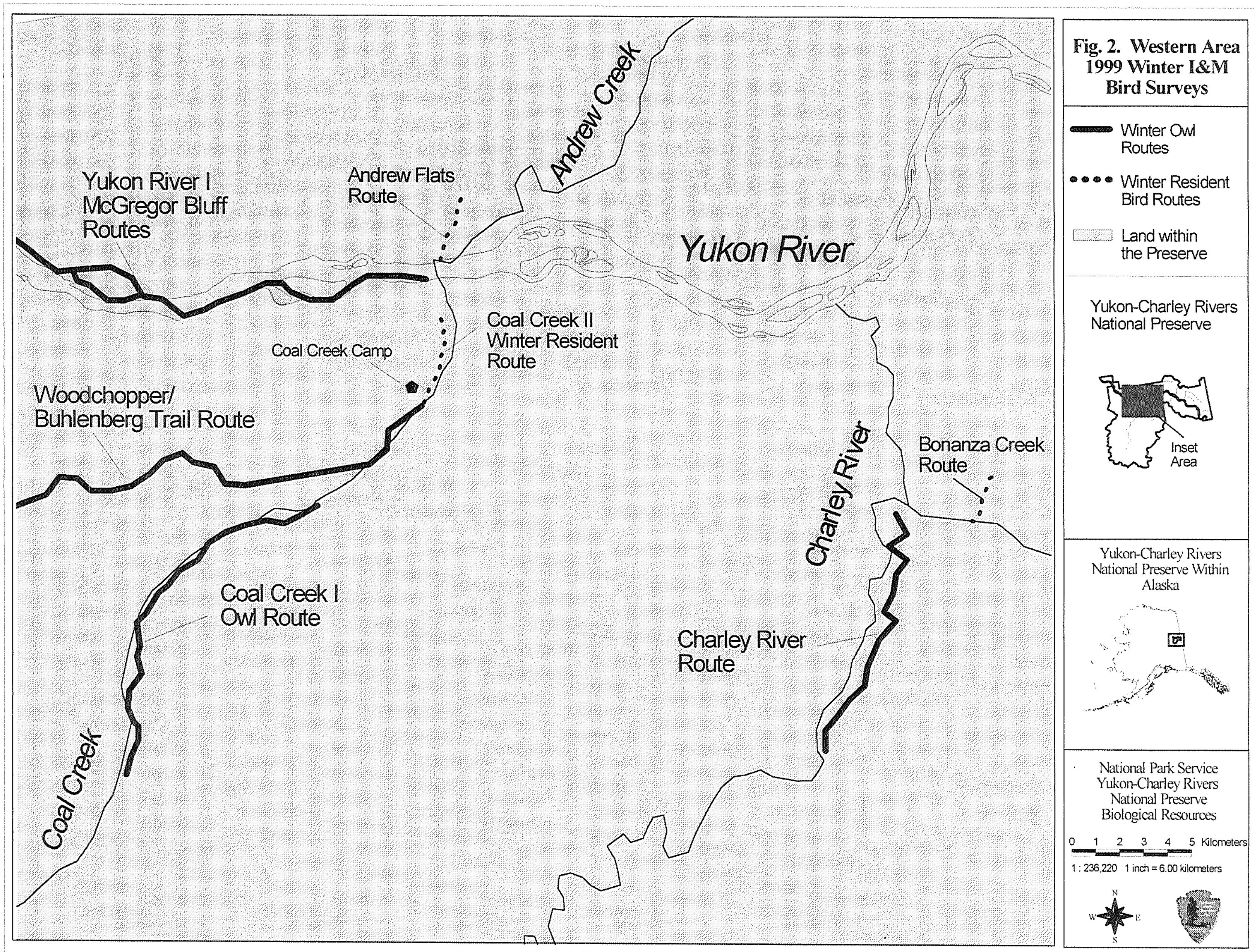

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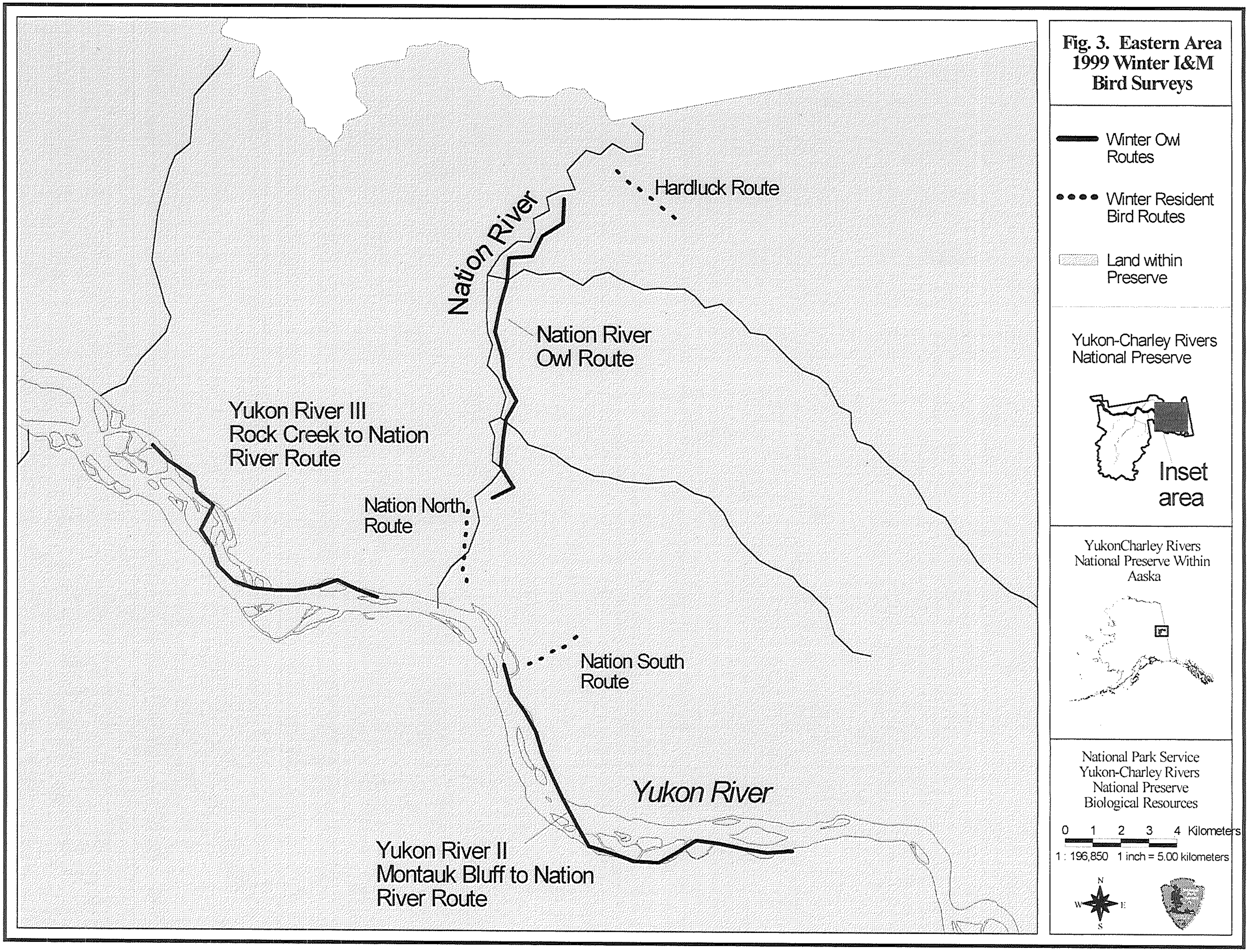

Fig. 3. Eastern Area 1999 Winter I&M Bird Surveys

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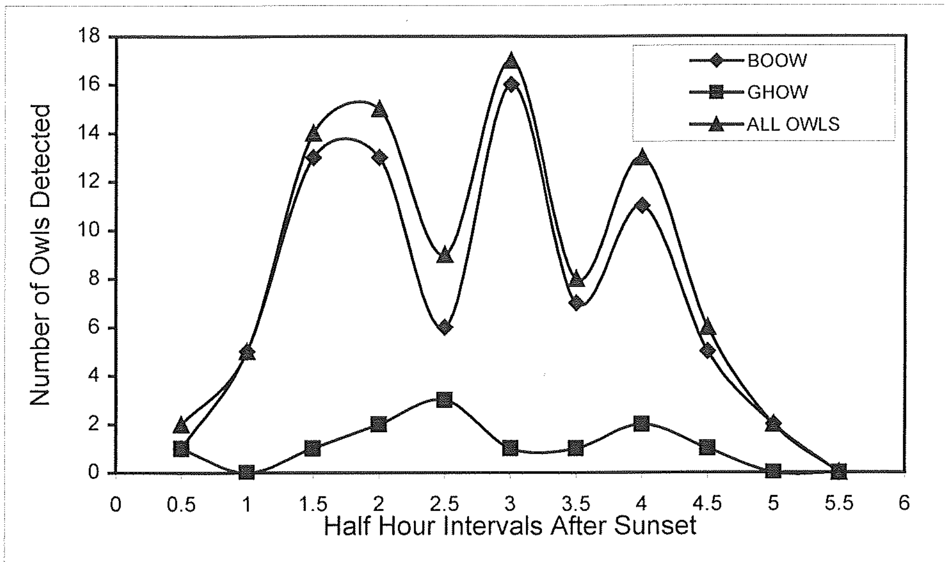

Fig. 4(a). Number of boreal (BOOW) and great-horned (GHOW) owls detected by half hour intervals after sunset during owl surveys in Yukon-Charley Rivers National Preserve, AK, March and April 1999. Owls were assigned to half hour intervals reflecting when after sunset they were detected. Time intervals are as follows: 0 - 30 mins. after sunset = 0.5, 31 - 60 = 1, 61 - 90 = 1.5, 91 - 120 = 2, 121 - 150 = 2.5, 151 - 180 = 3, 181 - 210 = 3.5, 211 - 240 = 4, 241 - 270 = 4.5, 271 - 300 = 5, 301 - 330 = 5.5.

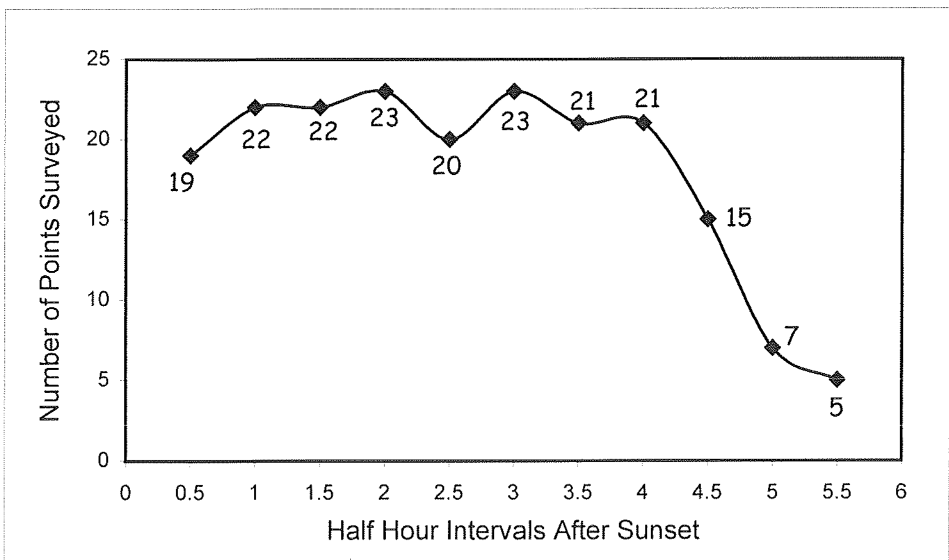

Fig. 4(b). Number of points surveyed by half hour time intervals during owl surveys in Yukon-Charley Rivers National Preserve, AK, March and April 1999. Half hour intervals are the same as in Fig. 4(a).

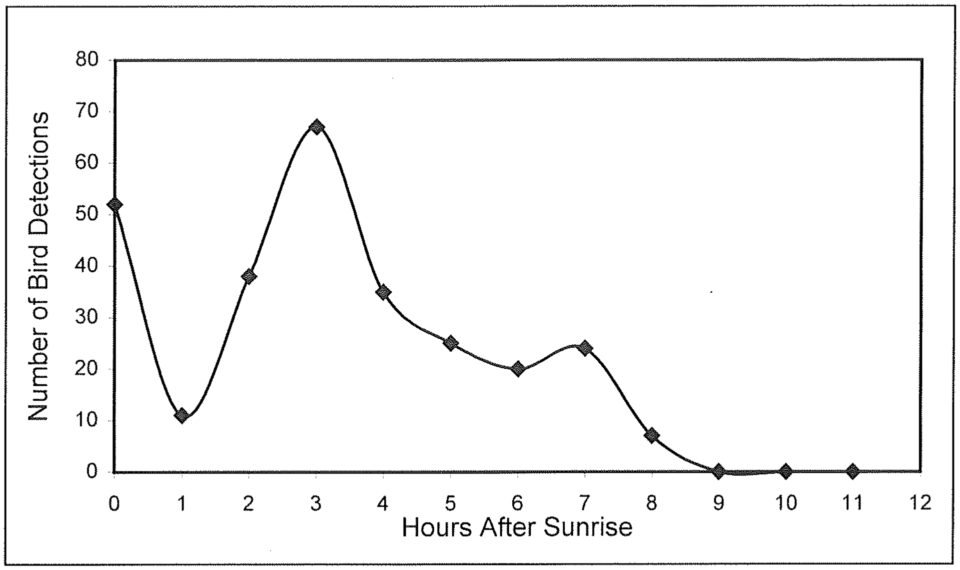

Fig. 5(a).

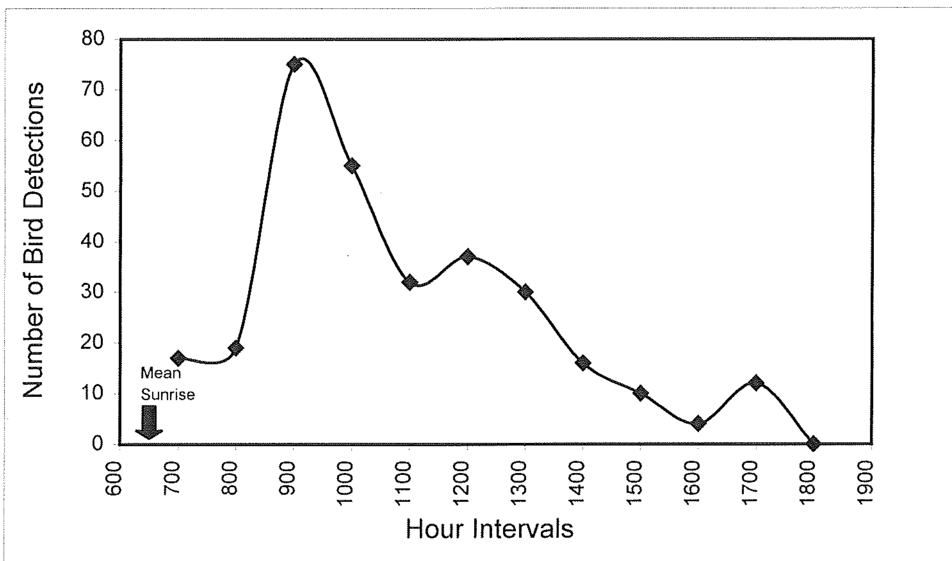

Fig. 5(b).

Fig. 5(a-b). Numbers of birds detected by hour intervals relative to sunrise (5a) and to time of day (5b) during off-road point count surveys in Yukon-Charley Rivers National Preserve, AK, March 1999. Hour intervals were calculated as follows: 0700 h - 0759 h = 700, 0800 h - 0859 h = 800, 0900 h - 0959 h = 900, etc.

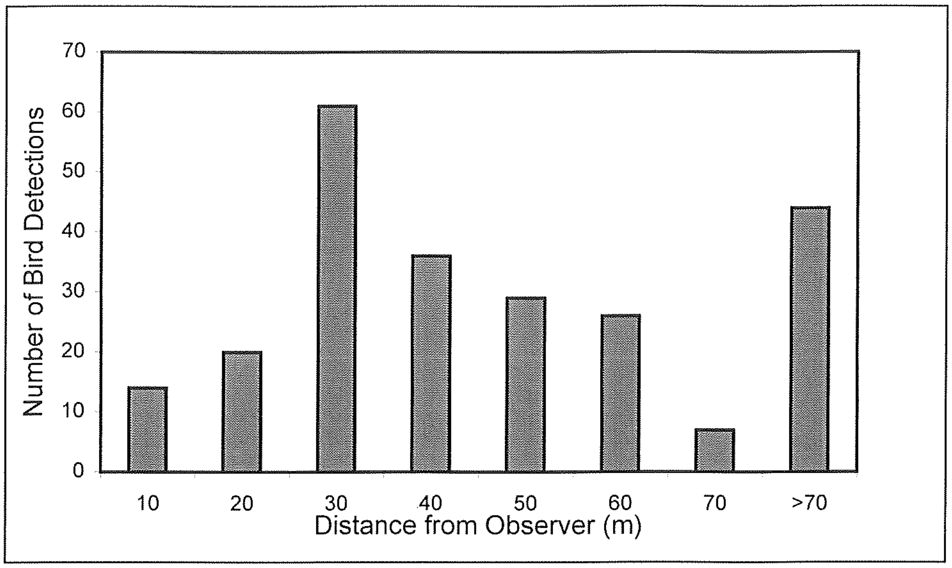

Fig. 6. Number of bird detections by distance from observer during off-road point count surveys in Yukon-Charley Rivers National Preserve, AK, March 1999.

Table 1. Winter owl survey routes, ecounits sampled, number of points sampled, and number of owls per point by route in Yukon–Charley Rivers National Preserve, AK, March 16–24, 1999. Ecounits are defined when they first appear on the table; abbreviations are used thereafter.

Route Name	Survey Date	Ecounits Sampled	Sample Points (n)	Boreal Owls Detected per Point	Great-horned Owls Detected per Point
Coal Creek	17 March 1999	TH—Tintina Hills CF—Charley Foothills	23	0.35 (n = 8 owls)	0
Yukon River I-McGregor Bluff	18 March 1999	BH1—Biederman Hills BH2—Biederman Hills Bluffs YV1—Yukon River, Active Floodplain YV3—Yukon River, Wet Terraces with Few Ponds YV5—Yukon River, High Terraces, Undulating	24	0	0
Woodchopper/Buhlenberg Trail	18 March 1999	BH1—Biederman Hills TH—Tintina Hills TL—Thanksgiving loess	22	0.09 (n = 2)	0
Charley River	19 March 1999	CF—Charley Foothills TH—Tintina Hills YV6—Yukon River, Nation/Kandik/Bonanza Valleys	16	0.38 (n = 6)	0.06 (n = 1)

Table 1. Continued.

Route Name	Survey Date	Ecounits Traversed	Sample Points (n)	Boreal Owls Detected per Point	Great-horned Owls Detected per Point
Nation River	21 March 1999	OF1—Ogilvie Foothills HL—Hard Luck Lowland YV6—Yukon River, Nation/Kandik/Bonanza Valleys	16	0.63 (n = 10 owls)	0.06 (n = 1)
Yukon River II–Montauk Bluff to Nation River	22 March 1999	OF1—Ogilvie Foothills YV1—Yukon River, Active Floodplain YV3—Yukon River, Wet Terraces with Few Ponds YV5—Yukon River, High Terraces, Undulating	18	0.67 (n = 12)	0.11 (n = 2)
Yukon River III—Rock Creek to Nation River	24 March 1999	OF1—Ogilvie Foothills OF2—Ogilvie Foothills Bluffs YV1—Yukon River, Active Floodplain YV3—Yukon River, Wet Terraces with Few Ponds YV5—Yukon River, High Terraces, Undulating	16	0.69 (n = 11)	0.06 (n = 1)
Coal Creek	6 April 1999	TH—Tintina Hills CF—Charley Foothills	16	0.06 (n = 1)	0
Woodchopper/Buhlenberg Trail	7 April 1999	BH1—Biederman Hills TH—Tintina Hills TL—Thanksgiving Loess	19	0.05 (n = 1)	0.05 (n = 1)

Table 1. Continued.

Route Name	Survey Date	Ecounits Traversed	Sample Points (n)	Boreal Owls Detected per Point	Great-horned Owls Detected per Point
Yukon River I–McGregor Bluff	8 April 1999	BH1—Biederman Hills BH2—Biederman Hills Bluffs YV1—Yukon River, Active Floodplain YV3—Yukon River, Wet Terraces with Few Ponds YV5—Yukon River, High Terraces, Undulating	16	0.25 ($n = 4$)	0.13 ($n = 2$)

Table 2. Winter off-road point count transect routes, ecounits traversed, and number of bird species detected by route in Yukon-Charley Rivers National Preserve, AK, March 16-24, 1999.

Route Name	Ecounits Traversed	Number of Points Sampled by Ecounit	Number of Bird Species Detected by Route
Andrew Flats	YV1—Yukon River Valley, Active Flood Plain	7	6
	YV2—Yukon River Valley, Wet terraces with Oxbows	5	
Bonanza Creek	YV6—Yukon River Valley, Nation/Kandik/Bonanza Tributary Valleys	1	6
	TH—Tintina Hills	11	
Coal Creek II	BH1—Biederman Hills	12	7
Hard Luck	HL—Hard Luck Lowland	10	6
Nation River North	YV6—Yukon River Valley, Nation/Kandik/Bonanza Tributary Valleys	12	8
Nation River South	YV3—Yukon River Valley, Wet Terraces with few Ponds	5	5
	YV5—Yukon River Valley, High Terraces, Undulating	5	

Table 3. Relative abundance estimates for bird species detected on winter off-road point count routes in Yukon-Charley Rivers National Preserve, AK, March 16-24, 1999.

Species	Relative Abundance (n = 306 birds)
Northern Goshawk (*Accipiter gentilis*)	.003
Ruffed Grouse (*Bonasa umbellus*)	.003
Sharp-tailed Grouse (*Tympanuchus phasianellus*)	.007
Boreal Owl (*Aegolius funereus*)	.003
Northern Hawk Owl (*Surnia ulula*)	.003
Hairy Woodpecker (*Picoides villosus*)	.007
Three-toed Woodpecker (*Picoides tridactylus*)	.033
Gray Jay (*Perisoreus canadensis*)	.200
Common Raven (Corvus corax)	.052
Black-capped Chickadee (*Parus atricapillus*)	.007
Boreal Chickadee (*Parus hudsonicus*)	.092
Pine Grosbeak (*Pinicola enucleator*)	.016
White-winged Crossbill (*Loxia leucoptera*)	.131
Common Redpoll (*Carduelis flammea*)	.441

Table 4. Ecounits and earth cover classes sampled during winter off-road point count surveys in Yukon-Charley Rivers National Preserve, AK, March 16-24, 1999.

Ecounit	Earth Cover Vegetation Class
Biederman Hills (BH1)	Open Needleleaf
	Closed Mixed Deciduous
	Open Mixed Deciduous
	Open Mixed Needleleaf/Deciduous
Hard Luck Lowland (HL)	Open Needleleaf
	Woodland Needleleaf
	Tall Shrub
Tintina Hills (TH)	Open Needleleaf
	Woodland Needleleaf
	Open Mixed Deciduous
Yukon River Valley—Active Flood Plain (YV1)	Open Needleleaf
	Tall Shrub
Yukon River Valley—Wet Terraces with Oxbows (YV2)	Open Needleleaf
	Woodland Needleleaf
Yukon River Valley—Wet Terraces with Few Ponds (YV3)	Woodland Needleleaf
	Tall Shrub
	Low Shrub/Tussock Tundra
Yukon River Valley—High Terraces, Undulating (YV5)	Woodland Needleleaf
	Open Mixed Needleleaf/Deciduous
Yukon River Valley—Nation/Kandik/Bonanza Valleys (YV6)	Open Needleleaf
	Closed Mixed Deciduous
	Closed Needleleaf

Table 5. Species detection frequency for wintering birds in each earth cover vegetation class sampled during off-road point count transects in Yukon-Charley Rivers National Preserve, March 16-24, 1999.

Species	Closed Needleleaf	Open Needleleaf	Woodland Needleleaf	Closed Mixed Deciduous	Open Mixed Deciduous	Open Mixed Needleleaf/ Deciduous	Tall Shrub	Low Shrub/ Tussock Tundra	Number of Birds Detected
Northern Goshawk		1.00							1
Ruffed Grouse		1.00							1
Sharp-tailed Grouse			1.00						2
Boreal Owl								1.00	1
Northern Hawk Owl			1.00						1
Hairy Woodpecker		1.00							2
Three-toed Woodpecker		.50	.50						10
Gray Jay	.02	.54	.25	.02	.08	.05	.02	.03	61
Common Raven		.19	.56	.06			.06	.13	16
Black-capped Chickadee		1.0							2
Boreal Chickadee	.11	.71	.07	.07		.04			28
Pine Grosbeak		.20	.40	.40					5
White-winged Crossbill	.03	.65				.28	.03	.03	34
Common Redpoll		.40	.35	.05	.01	.16	.02	.01	135
Number of sample points in each earth cover class	n = 1	n = 32	n = 23	n = 2	n = 2	n = 4	n = 2	n = 2	
Number of birds per point	5.0	4.7	3.6	6.5	3.0	9.3	3.0	3.5	